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Case Report

Portal Vein Injury in a Patient Undergoing Video-Assisted Cholecystectomy: Case Report and Review of Literature

Lesão da Veia Porta em Paciente Submetido à Colecistectomia por Videolaparoscopia: Relato de Caso e Revisão da Literatura

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ABSTRACT

The laparoscopic approach has been recognized as a standard of excellence for cholecystectomy, one of the most frequently performed procedures in the world. We report an unusual case of damage to the portal vein in patients undergoing laparoscopic cholecystectomy and monitor the clinical evolution of patients with documentation of new clinical events. We performed a MEDLINE search using the following keywords: "portal venous injury" and "laparoscopic cholecystectomy". We identified in the literature few case reports of injuries of the portal vein or its branches in this procedure. Vascular lesions are not rare; however, particularly those affecting the portal vein during this procedure are uncommon, which justifies the publication.

Key words: portal vein; cholecystectomy, laparoscopy; complications.

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INTRODUCTION

Gallstone disease is one of the most frequent pathological conditions of the digestive system, leading the incidence of diseases of the liver and bile ducts.[1] It affects approximately 25% of women and between 10% and 15% of men over 50 years of age.[1] Because minimally invasive surgery offers to less suffering, decreased metabolic imbalance, and faster recovery, this approach has become widely and enthusiastically adopted.[2,3]

Injury to the bile ducts is an important complication that may lead to death owing to peritonitis and biliary sepsis. The principal associated morbidities are benign biliary stenosis, cholangitis, secondary biliary cirrhosis, portal hypertension and liver failure. Injury to the bile ducts and vascular injury significantly contribute to morbidity and mortality. Depending on the degree of liver damage, liver resection, and even liver transplantation may be necessary.[4,5,6.]

Because the right hepatic artery frequently runs close and parallel to the cystic duct, it is especially vulnerable to injury, chiefly if the structures of the Calot's triangle are not clearly identified.[6] Most problems arise when the anatomical distribution is altered. Such anatomical alterations may be due to inflammation or another pathology such as a tumor, and is even more likely when inflammation is superimposed on anatomical variations of the hepatoduodenal ligament and hepatic hilum.[7]Ouvir

We report a rare case of portal vein injury in a patient undergoing video-assisted cholecystectomy, and compare it with other cases reported in the literature.

CASE REPORT

The patient was a 49-year-old white male from Rio de Janeiro, who had multiple small gallbladder stones, and a history of several episodes of biliary colic. Complete blood count, hemostasis and thrombosis screening, serum glucose and serum thyroid-stimulating hormone (TSH) were normal. Operative risk being was graded as level I. The patient was then referred for video laparoscopic cholecystectomy. Upon trocar insertion, and upon release of loose adhesions

connecting the epiploon to the gallbladder unusually intense bleeding was noticed through the ports. There was a second, firm adhesion from the anterior wall of the duodenal bulb to the inferior aspect of the liver, anterior to the hepatic pedicle, hampering access to the latter. The cautery (Hook) was used to release this adhesion, with massive non-pulsatile dark bleeding, compatible with a venous origin, developing near the end of the procedure. Wide right subcostal laparotomy was performed immediately to access the hepatic pedicle.

There was massive bleeding from an anomalously positioned portal vein, hidden in the duodenal-hepatic adhesion. The bleeding was controlled with a Satinsky clamp and suture. A cholecystectomy according to the standard technique was subsequently performed. Because there was minimal bile extravasation from the confluence of the hepatic ducts, we opted for the placement of a Penrose drain, with suture of the abdominal wall. Some minutes later, however, while the patient was still on the operating table, there was massive bleeding from the abdominal wall, with formation of a large hematoma, with little blood flow though the Penrose drain. Another laparotomy identified a small volume of diffuse bleeding at the hepatic pedicle. Compressive hemostasis was performed with two large bandages placed in the subhepatic region, along with the placement of a Kehr's T-drain due to the bile extravasation. Only the skin was sutured, and another laparotomy for bandage removal, hemostasis and bile extravasation revision, and definitive closure was scheduled for 48 hours thereafter. During this repeat laparotomy, no more bleeding or bile extravasation were observed, and the wall was closed in planes. The patient was admitted to the intensive care unit, where he required mechanical ventilation for 12 days, due to pulmonary edema and respiratory failure upon extubation. During the surgery and the postoperative period, he received 5 units of blood. While in the ICU, there was marked leukopenia (< 2,000 leukocytes/ mm^3), and he received empiric antibiotics, although no bacterial infection was recognized. An anti-HIV ELISA was positive. The abdominal drain was removed one week after the surgery, and the Kehr's T-drain was kept in position. On the 14th postoperative day, a cholangiography performed through the Kehr's T-drain identified residual choledocholithiasis. The patient underwent endoscopic retrograde pancreatography (ERCP), with papillotomy and removal of the stones. The Kher's T-drain was removed and the patient was discharged.

DISCUSSION

Laparoscopy results in more injury to the bile ducts than the open procedure. Studies comparing both approaches found a large vascular injury in 0.044% of the laparoscopic procedures, compared to 0.0% of the open approaches, and visceral injury in 0.07% of the laparoscopic procedures compared to 0.05% of the open approaches. [4,5,6,8] Moreover, bile duct injury during laparosopic cholecystectomy more frequently consists of complete transection, and thus is more serious than the injury occurring during open surgery. [4]

Access to the peritoneal cavity is the most delicate step; fatal complications are often related to needle and trocar insertion.[8] Because complications during primary access have not been significantly reduced, in spite of improvements in technology and surgical skills, several techniques aimed at preventing injury have been described. [8] Pneumoperitoneum, perhaps the most frequently of these techniques, has a mortality rate up to 0.2%. Injury to the bile ducts may be fatal or lead to long-lasting morbidity, increasing treatment costs or prompting litigation. [8]

The main causes of iatrogenic vascular injury are related to anatomical misidentification, thermal injury, inadvertently displacing clips, or excessive manipulation of the common biliary duct. Large vascular injury generally happens during dissection of the Calot's triangle, where the portal vein or right hepatic artery are closely related to the biliary tract, and susceptible to accidental injury or clipping.[1,9]

We conducted a search of the MEDLINE databank/database, using the terms: "portal venous injury" and "laparoscopic cholecystectomy", and identified several case reports of injury to the portal vein or its branches in patients undergoing videolaparoscopic cholecystectomy.

There is a wide variation in the incidence rates of vascular injury due to laparoscopic cholecystectomy, as reported from different studies. CHAPMAN *et al*[10] reported injury to the hepatic artery and/or portal vein in 28 (21%) of 132 patients, with injury to the biliary duct, whereas BACHA[11] reported 4.9% of vascular injury caused by laparoscopic cholecystectomy.[11] A recent study from the Northwestern University Medical School[12] reported

vascular injury in 71% of Bismuth level 4 patients, and in 63% of Bismuth level 3 patients.[11] The incidence rates of injury during laparoscopy to the main vascular elements – including the aorta, iliac vessels, inferior vena cava, mesenteric arteries and lumbar arteries – range from 0.07% to 0.4%, whereas the incidence rates of injury to minor vessels (branches of the epigastric, mesenteric and omental vessels) range from 0.1% to 1.2%.[13] Mortality rates range from 0.05% to 0.2%.[13]

BUELL *et al*.[14] reported the following complications: sepsis, infection of the surgical wound, relapsing cholangitis, and the need for prolonged ventilation. In a univariate analysis, arterial injury *versus* no arterial lesion was a predictor of mortality (38% vs 3%).[14]

GADZIJEV[7] reported injury to the common biliary duct and portal vein in a 38-year-old female during open right adrenalectomy, and injury to the common biliary duct in a 73-year-old male undergoing laparoscopic cholecystectomy. Both patients underwent liver transplantation.[7] RAGOZZINO et al.[5] reported two cases of laparoscopic cholecystectomy. The first case was a 39-year-old female with gallstones, in whom there was complete occlusion of the right hepatic artery immediately distal to the origin of the gastroduodenal artery, and occlusion of the right portal branch. The second case was a 36-year-old female with cholelithiasis and occlusion of the right hepatic artery and portal vein, caused by a surgical clamp.[5]

FIELDS et al.[15] reported the need for conversion to open laparotomy when laparoscopy revealed considerable inflammation of the gallbladder and surrounding structures, with excessive bleeding in the cystic area, and injury to the common biliary duct, in a patient with agenesis of the right hepatic lobule.[15] FELEKOURAS *et al*.[6] also reported the need for conversion to open laparotomy in a 75-year-old male with acute cholecystitis, due to severe inflammation and dense adhesions in the Calot's triangle, with bleeding due to injury to the portal vein obscuring the surgical field.[6]

In this case, the presence of firm grip extending from the anterior wall of the duodenal bulb to the underside of the liver in hepatic-duodenal region, resulted in the inability to access or visualize the portal vein since it was subsumed in the adherence and displaced forward in relation to its normal anatomical position. This situation led to the injury of this vascular structure.

CONCLUSION

Vascular injury during laparoscopic cholecystectomy, not so uncommon, may be serious, generating grave complications and putting the patient's life at risk. Therefore, adequate monitoring and early diagnosis are necessary, as a change in the surgical approach can correct the injury and reduce morbidity and mortality.

RESUMO

A via laparoscópica tem sido reconhecida como padrão de excelência para a colecistectomia, sendo um dos procedimentos cirúrgicos mais realizados no mundo. Relatamos um caso incomum de lesão de veia porta anteriorizada em paciente submetido à colecistectomia videolaparoscópica e acompanhamos a evolução do paciente com registro dos novos eventos clínicos. Foi realizada uma pesquisa no MEDLINE utilizando as seguintes palavras-chave: "portal venous injury" and "laparoscopic cholecystectomy". Identificamos na literatura poucos relatos de casos associados à lesão da veia porta ou seus ramos neste procedimento. Lesões vasculares não são raras, porém, especificamente as que acometem a veia porta durante este procedimento são incomuns, o que justifica sua publicação.

Descritores: veia porta; colecistectomia laparoscópica; complicações.

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